



## CITY OF SANTA BARBARA

### COUNCIL AGENDA REPORT

**AGENDA DATE:** March 13, 2007

**TO:** Mayor and Councilmembers

**FROM:** Creeks Division, Parks and Recreation Department

**SUBJECT:** Water Quality Monitoring Program Update

#### RECOMMENDATION:

That Council receive a presentation from the Creeks Division on the Water Quality Monitoring Program and key findings from the 2001-2006 Water Quality Monitoring Program Report.

#### EXECUTIVE SUMMARY:

The Creeks Division has implemented a water quality monitoring program since 2001. Water quality monitoring allows the Creeks Division to identify problems, track changes, assess performance, and build a baseline of data for future projects. Several tools are used for monitoring, including tests for indicator bacteria and chemical pollutants, field tests of water quality parameters relevant to aquatic organisms, DNA-based methods, creek walks, and biological assessments. In late 2006, the Creeks Division completed a 5-year report on the results of the monitoring program. The report compiles and synthesizes the data in ways that can be used to inform decisions, and to provide information to the public. The Water Quality Monitoring Program is funded through the annual Creeks Division operating budget.

#### DISCUSSION:

##### Background

The Creeks Division Monitoring Program began in May 2001 and since then, has collected extensive data on indicator bacteria and water quality parameters. Early efforts focused on quantifying the degree of microbial pollution in creek water and identifying hot spots in order to prioritize treatment projects. Additional goals were to establish baselines for indicator bacteria and water quality parameters in order to track improvements over time,

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and to understand the connections between creek and lagoon water quality to beach warnings.

In 2004, the monitoring program was expanded and modified, particularly by expanding the storm monitoring and the restoration/water quality treatment assessment elements to include regular testing for chemical pollutants. In addition, the Creeks Division sponsored a UCSB Bren School graduate project that focused on evaluating the relationship between the types of land use and pollution in storm water.

In 2005, the Creeks Division continued to implement the monitoring program and made a few minor modifications to improve storm monitoring and incorporate recommendations from the Bren School graduate project. As an example, the Bren project recommended classifying sampling sites based on their role as integrator or indicator sites. Integrator sites, typically located at the downstream end of a watershed or subwatershed, are used to assess the total pollution impact on the watershed and how watershed-wide projects can improve water quality. Indicator sites are located at the outflow of smaller drainage areas that can be categorized by land use(s). In addition to integrator and indicator sites, the Creeks Division also samples at project assessment sites for restoration and water quality treatment projects.

#### Water Quality Monitoring Program

Water quality monitoring allows the Creeks Division to identify problems, track changes over time, assess the performance of restoration and treatment projects, and build a baseline of data for future projects. The Creeks Division uses several tools for monitoring, including tests for indicator bacteria and chemical pollutants, field tests of water quality parameters relevant to aquatic organisms, DNA-based methods, creek walks, and biological assessments.

The primary goals of the monitoring program are to:

- Quantify the levels of bacterial and chemical pollution in watersheds throughout the city.
- Evaluate the effectiveness of the City's restoration and water quality treatment projects in reducing pollutant levels.

The secondary goals of the program are to:

- Determine the water quality for aquatic organisms, including fish, invertebrates, amphibians, and plants, in watersheds throughout the City.
- Evaluate the effectiveness of the City's restoration and water quality treatment projects in improving water quality for aquatic organisms.

The monitoring program consists of seven key elements:

1. **Routine watershed assessment** focuses on microbial contamination, as measured by indicator bacteria, and water quality parameters (physicochemical properties including pH, temperature, dissolved oxygen, turbidity, conductivity) that are relevant to aquatic organisms. These data are to establish baseline information, track long-term changes, and identify emerging hot spots.
2. **Storm monitoring** is used to identify chemical constituents of concern and to identify pollution hot spots. Sampling is also used to ask questions about how pollutants reach the creeks, e.g. do some pollutants arrive during first flush storms while others arrive during large, sustained events? Data are also used to establish baselines and evaluate the performance of storm water management projects.
3. **Restoration and water quality treatment assessment** is used to determine the success of projects in lowering microbial and chemical pollution levels and improving water quality for aquatic organisms.
4. **Microbial source tracking** is used to develop better tools for tracking fecal pollution in creeks and to identify sources of indicator bacteria.
5. **Biological assessment** uses benthic macroinvertebrate surveys and an index of biological integrity to assess and track the health of creeks for aquatic organisms.
6. **Creek walks** from the ocean to upper watersheds are used to identify problem areas within creeks and track changes due to natural processes and development. Problem areas may include sources of polluted input to the creek or sites of habitat degradation.
7. **Special studies** are undertaken to address various questions and issues that arise during the course of each monitoring year.

#### 2001-2006 Water Quality Monitoring Program Report

In late 2006, the Creeks Division completed a 5-year report on the results of the monitoring program. The purpose of the report is to compile and synthesize the data in ways that can be used to inform decisions and to provide information to the public. The report also provides an opportunity to revisit research questions based on the results obtained. Due to its size and numerous appendices, only a Report Summary is attached to this Council Agenda Report. A copy of the full report is available on the Creeks Division web page, [www.santabarbaraca.gov/Resident/Community/Creeks/](http://www.santabarbaraca.gov/Resident/Community/Creeks/), and is available for review in the Creeks Division Office at 620 Laguna Street.

### Key Findings

With more than five years of data, the Monitoring Program provides a solid baseline for understanding water quality issues. Examples of some key findings include:

- **Routine watershed assessment** has demonstrated the seasonal and inter-annual variability of indicator bacteria values and provided evidence for hot spots of bacterial contamination.
- **Storm monitoring** has identified constituents of concern, including dissolved copper, MBAS, oil and grease, sediment, and indicator bacteria and has confirmed that first-flush storms carry higher concentrations of pollutants to creeks, compared to later, larger storms.
- Quarterly sampling of chemical constituents at select **project assessment** sites (upstream and downstream of current and proposed projects) showed very low concentrations of most pollutants during dry weather. There were no detections of dissolved metals, glyphosate, or pesticides in the samples.
- **Microbial source tracking** has confirmed that hot spots based on indicator bacteria data can be sites where human waste is present. On multiple days, source tracking studies by UCSB confirmed the presence of human waste and/or sewage in the Haley Street Storm Drain, Hope Avenue Drain, and points downstream in Mission Creek and Hope Drain, respectively.
- **Creek Walks** confirm that the highest densities of encampment and day-use related creek pollution were found in Mission Creek and the Laguna Channel. At the same time, the amount of trash observed decreased substantially between 1999 and 2005. The explanation for the decrease is likely a combination of different creek flow histories and the impact of City programs such as weekly creek clean-ups, curb inlet screens, street sweeping, and community outreach.
- Annual **bioassessment studies** demonstrate that Benthic macroinvertebrate communities in the lower, urbanized corridors of Arroyo Burro and Mission Creek are not as robust as aquatic communities in the upper watersheds.
- **Beach Warning and Bacteria:** Analysis of dry-season data (April 1 – October 30) from the County showed low rates of beach warnings at Arroyo Burro Beach, Leadbetter Beach, East Beach at Mission Creek, and East Beach at Sycamore Creek. Warnings due to *Enterococcus* levels, which are known to be the best predictor of health concerns, were usually based on levels very close to the state criterion.

The attached Report Summary as well as the full report provides additional detail about the monitoring program analysis and key findings. The attached table and maps indicate the various sampling locations of the monitoring program.

### Next Steps

With the completion of the five-year monitoring program report, the Creeks Division, working with the Creeks Advisory Committee and its Water Quality Subcommittee, has identified a number of program recommendations to further pinpoint sources of creek and ocean pollution, and develop projects and programs to improve creek and ocean water quality. As an example, recommendations for the monitoring program to implement over the next one to five years are:

- Reallocate resources to limit routine watershed monitoring except as necessary to evaluate long-term trends.
- Shift toward the use of DNA-based and traditional tools to confirm human contamination at hot spots and locate sources upstream, i.e., up storm drains.
- Expand toolbox to be able to track loads, in addition to concentration, of pollutants in creeks and drains.
- Maintain partnerships to continue work on DNA-based source tracking.
- Expand focus of microbial contamination research to include wet weather.
- Investigate the use of GIS tools to better interpret spatial data and to focus monitoring efforts.
- Investigate the use of watershed models to better analyze what-if scenarios.

The Creeks Division is developing a work program and budget for consideration at the March 14, 2007, regular meeting of the Creeks Advisory Committee and inclusion in the proposed Fiscal Year 2008-09 budget.

### **SUSTAINABILITY IMPACT:**

The Water Quality Monitoring Program provides valuable information for the Creeks Division's water quality improvement programs and contributes to the City's Sustainable Santa Barbara Program goals to improve creek and coastal ocean water quality.

### **BUDGET/FINANCIAL INFORMATION:**

The Water Quality Monitoring Program is funded through the annual Creeks Division operating budget. Program staff includes a part-time Water Quality Monitor and a part-time Water Resources Specialist. The Creeks Division contracts for lab analysis, annual bioassessment surveys, and DNA microbial source tracking research. Although it can vary from year to year, approximately \$100,000 is spent annually on lab analysis and surveys. In 2004, the City Council approved a 3-year, \$338,000 research contract with Dr. Holden of UCSB for DNA Microbial Source Tracking Research. Research conducted by

Dr. Holden's lab has played an important role in the City's efforts to assess the presence of human waste in city storm drains and creeks.

**ATTACHMENTS:** 1. Report Summary, Five Year Water Quality Report  
2. Monitoring locations table and maps

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**APPROVED BY:** City Administrator's Office